Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

<u>Listing of Claims:</u>

1.   (Currently Amended)   A method of splitting an image block, comprising:

setting a plurality of splitting threshold values for a macro block in an image frame and determining whether to split the macro block into sub blocks; ~~and~~

setting a plurality of splitting threshold values for each sub block and determining whether to split each sub block into smaller sub blocks<u>;</u>

<u>wherein the determining whether to split the image block into sub blocks is performed by determining whether the image block has been split in a preceding image frame at the same location</u>.

2.   (Currently Amended)   The method of claim 1, wherein the operation of setting a plurality of splitting threshold values for a macro block ~~in an image frame~~ and determining whether to split the macro block into sub blocks is performed ~~by referring to~~ <u>by determining</u> whether a <u>the</u> macro block ~~placed at the same location~~ <u>has been split</u> in a preceding image frame <u>at the same location</u> ~~as the current macro block has been split~~.

3.   (Currently Amended)   The method of claim 1, wherein the operation of setting a plurality of splitting threshold values for each sub block and determining whether to split each sub block into smaller sub blocks is performed ~~by referring to~~ <u>by determining</u> whether a <u>the</u> sub block ~~placed at the same location~~ <u>has been split</u> in a preceding image frame <u>at the same location</u> ~~as the current sub block has been split~~.

4.   (Original)   The method of claim 1, wherein the operation of setting a plurality of splitting threshold values for a macro block in an image frame and determining whether to split the macro block into sub blocks comprises:

determining the possibility of splitting the macro block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of a sub block in the macro block is greater than a threshold value for determining the possibility of splitting the macro block; and

determining whether to split the macro block by comparing the threshold value for determining the possibility of splitting the macro block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the macro block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the macro block in the operation of setting a plurality of splitting threshold values for the macro block in an image frame and determining whether to split the macro block into the sub blocks.

5.   (Original)   The method of claim 2, wherein the operation of setting a plurality of splitting threshold values for a macro block in an image frame and determining whether to split the macro block into sub blocks comprises:

determining the possibility of splitting the macro block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of a sub block in the macro block is greater than a threshold value for determining the possibility of splitting the macro block; and

determining whether to split the macro block by comparing the threshold value for determining the possibility of splitting the macro block, the ratio of maximum MAD to minimum MAD, and the threshold value for determining whether to split the macro block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the macro block in the operation of setting a plurality of splitting threshold value for the macro block in the image frame and determining whether to split the macro block into the sub blocks.

6.   (Original)   The method of claim 1, wherein the operation of setting a plurality of splitting threshold values for each sub block and determining whether to split each sub block into smaller sub blocks comprises:

determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block; and

determining whether to split the sub block by comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the sub block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block in the operation of determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block.

7.   (Original)   The method of claim 3, wherein the operation of setting a plurality of splitting threshold values for each sub block and determining whether to split each sub block into smaller sub blocks comprises:

determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block; and

determining whether to split the sub block by comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the sub block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block in the operation of determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than the threshold value for determining the possibility of splitting the sub block.

8.   (Currently Amended)   The method of claim 4, wherein the operation of determining whether to split the sub block by comparing the threshold value for determining the possibility of splitting the ~~sub~~ macro block, the ratio of maximum MAD to minimum MAD, and [[a]] a-the threshold value for determining whether to split the ~~sub~~ sub-macro block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block in the operation of determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the ~~smaller sub~~ macro block is greater than a threshold value for determining the possibility of splitting the sub block comprises:

determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and the threshold value for determining whether to split the macro block;

determining whether the preceding macro block has been split if the ratio is between the two threshold values in the operation of determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and the threshold value for determining whether to split the macro block; and

determining not to split the macro block if the preceding macro block has not been split, and determining to split the macro block if the preceding macro block has been split.

9.   (Original)   The method of claim 6, wherein the operation of determining whether to split the sub block by comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the sub block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block in the operation of determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block comprises:

determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and the threshold value for determining whether to split the sub block;

determining whether the preceding sub block has been split if the ratio is between the two threshold values in the operation of determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and the threshold value for determining whether to split the sub block; and

determining not to split the sub block if the preceding sub block has not been split, and determining to split the sub block if the preceding sub block has been split.

10.   (Original)   The method of claim 1, wherein the image frame is a binocular image frame representing a three dimensional image.

11.   (Original)   The method of claim 2, wherein the image frame is a binocular image frame representing a three dimensional image.

12.   (Original)   The method of claim 3, wherein the image frame is a binocular image frame representing a three dimensional image.

13.   (Original)   The method of claim 1, wherein the operation of splitting is performed using quadtree disparity estimation.

14. (Original) The method of claim 2, wherein the operation of splitting is performed using quadtree disparity estimation.

15. (Original) The method of claim 3, wherein the operation of splitting is performed using quadtree disparity estimation.

16. (Currently Amended) A method of splitting an image block, comprising:

setting a plurality of macro block splitting threshold values for splitting a macro block in an image frame into sub blocks and determining whether to split the macro block ~~according to~~ by determining whether a preceding macro block has been split ~~at the same location~~ in a preceding image frame at the same location ~~as the current macro block has been split~~; and

setting a plurality of sub block splitting threshold values for splitting the sub block into smaller sub blocks and determining whether to split the sub block into smaller sub blocks ~~according to~~ by determining whether a preceding sub block has been split ~~at the same location~~ in a preceding ~~macro block~~ image frame at the same location ~~as the current sub block has been~~ ~~split~~.

17.   (Currently Amended)   The method of claim 16, wherein the operation of setting a plurality of macro block splitting threshold values for splitting a macro block in an image frame into sub blocks and determining whether to split the macro block ~~according to~~ by determining whether ~~a~~ the macro block has been split ~~at the same location~~ in a preceding image frame at the same location ~~as the current macro block has been split~~ comprises:

determining the possibility of splitting the macro block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of a sub block in the macro block is greater than a threshold value for determining the possibility of splitting the macro block;

determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and a threshold value for determining whether to split the macro block;

determining whether the preceding macro block has been split if the ratio is between the two threshold values in the operation of determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and the threshold value for determining whether to split the macro block; and

determining not to split the macro block if the preceding macro block has not been split, and determining to split the macro block if the preceding macro block has been split.

18.   (Currently Amended)   The method of claim 16, wherein the operation of setting a plurality of sub block splitting threshold values for splitting the sub block into smaller sub blocks and determining whether to split the sub block into smaller sub blocks ~~according to~~ by determining whether a the sub block ~~at the same location~~ has been split in a preceding ~~macro block~~ image frame at the same location ~~as the current sub block has been split~~ comprises:

determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block;

determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and a threshold value for determining whether to split the sub block;

determining whether the preceding sub block has been split if the ratio is between the two threshold values in the operation of determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and the threshold value for determining whether to split the sub block; and

determining not to split the sub block if the preceding sub block has not been split, and determining to split the sub block if the preceding sub block has been split.

19.   (Original)   The method claim 16, wherein the image frame is a binocular image frame representing a three dimensional image.

20.   (Original)   The method claim 17, wherein the image frame is a binocular image frame representing a three dimensional image.

21.   (Original)   The method claim 18, wherein the image frame is a binocular image frame representing a three dimensional image.

22.   (Original)   The method of claim 16, wherein splitting is performed using quadtree disparity estimation.

23.   (Original)   The method of claim 17, wherein splitting is performed using quadtree disparity estimation.

24.   (Original)   The method of claim 18, wherein splitting is performed using quadtree disparity estimation.

25.   (Currently Amended)   A recording medium on which a method is written as a program code that can be read and executed on a computer, the program coded method comprising:

setting a plurality of splitting threshold values for a macro block in an image frame and determining whether to split the macro block into sub blocks; ~~and~~

setting a splitting threshold value for each sub block and determining whether to split each sub block into smaller sub blocks<u>;</u>

<u>wherein determining whether to split the macro block into sub blocks is performed by determining whether the macro block has been split in a preceding image frame at the same location</u>.

26.   (Currently Amended)   A recording medium on which a method is written as a program code that can be read and executed on a computer, ~~the~~ the program coded method comprising:

setting a plurality of macro block splitting threshold values for splitting a macro block in an image frame into sub blocks and determining whether to split the macro block <u>by determining</u> ~~according to~~ whether a <u>the</u> macro block <u>has been split</u> ~~at the same location~~ in a preceding image frame <u>at the same location</u> ~~as the current macro block has been split~~; and

setting a plurality of sub block splitting threshold values for splitting the sub block into smaller sub blocks and determining whether to split the sub block into smaller sub blocks ~~according to~~ <u>by determining</u> whether a <u>the</u> sub block <u>has been split</u> ~~at the same location~~ in a preceding ~~macro block~~ <u>image frame at the same location</u> ~~as the current sub block has been split~~.

11

27.   (Currently Amended)   An apparatus to split an image block, comprising:

a macro block splitting determining unit that sets a plurality of macro block splitting threshold values for splitting a macro block in an image frame into sub blocks and determines whether to split the macro block; ~~and~~

a sub block splitting determining unit that sets a plurality of sub block splitting threshold values for splitting each sub block into smaller sub blocks and determines whether to split the sub block<u>;</u>

<u>wherein a block splitting determining unit determines whether to split the image block into sub blocks by determining whether the image block has been split in a preceding image frame at the same location</u>.

28.   (Currently Amended)   The apparatus of claim 27, wherein the macro block splitting determining unit determines whether to split the macro block by ~~referring to~~ <u>determining</u> whether ~~a~~ <u>the</u> macro block <u>has been split</u> ~~at the same location~~ in a preceding image frame <u>at the same location</u> ~~as the current macro block has been split~~.

29.   (Currently Amended)   The apparatus of claim 27, wherein the sub block splitting determining unit determines whether to split the sub block by ~~referring to~~ <u>determining</u> whether ~~a~~ <u>the</u> sub block <u>has been split</u> ~~at the same location~~ in a preceding ~~macro block~~ <u>image frame at the same location</u> ~~as the sub block has been split~~.

30.   (Original)   The apparatus of claim 27, wherein the macro block splitting determining unit comprises:

a macro block splitting possibility determining portion that determines the possibility of splitting the macro block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of a sub block in the macro block is greater than a threshold value for determining the possibility of splitting the macro block; and

a macro block splitting determining portion that, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the macro block, determines whether to split the macro block by comparing the threshold value for determining the possibility of splitting the macro block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the macro block with one another.

31.   (Original)   The apparatus of claim 28, wherein the macro block splitting determining unit comprises:

a macro block splitting possibility determining portion that determines the possibility of splitting the macro block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of a sub block in the macro block is greater than a threshold value for determining the possibility of splitting the macro block; and

a macro block splitting determining portion that, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the macro block, determines whether to split the macro block by comparing the threshold value for determining the possibility of splitting the macro block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the macro block with one another.

32.   (Original)   The apparatus of claim 27, wherein the sub block splitting determining unit comprises:

a sub block splitting possibility determining portion that determines the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block; and

a sub block splitting determining portion that, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block, determines whether to split the sub block by comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and the threshold value for determining whether to split the sub block with one another.

33.   (Original)   The apparatus of claim 29, wherein the sub block splitting determining unit comprises:

a sub block splitting possibility determining portion that determines the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block; and

a sub block splitting determining portion that, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block, determines whether to split the sub block by comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the sub block with one another.

34.   (Original)   The apparatus of claim 30, wherein the macro block splitting determining portion comprises:

a preceding macro block splitting determiner that determines whether the preceding macro block has been split after determining that the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and the threshold value for determining whether to split the macro block; and

a macro block splitting final determiner that finally determines not to split the macro block if the preceding macro block has not been split, and determines to split the macro block if the preceding macro block has been split.

35.   (Original)   The apparatus of claim 32, wherein the sub block splitting determining portion comprises:

a preceding sub block splitting determiner that determines whether the preceding sub block has been split after determining that the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and the threshold value for determining whether to split the sub block; and

a sub block splitting final determiner that finally determines not to split the sub block if the preceding sub block has not been split, and determines to split the sub block if the preceding sub block has been split.

36.   (Original)   The apparatus of claim 27, wherein the image frame is a binocular image frame representing a three dimensional image.

37.   (Original)   The apparatus of claim 28, wherein the image frame is a binocular image frame representing a three dimensional image.

38.   (Original)   The apparatus of claim 29, wherein the image frame is a binocular image frame representing a three dimensional image.

39.   (Original)   The apparatus of claim 27, wherein splitting is performed using quadtree disparity estimation.

40.   (Original)   The apparatus of claim 28, wherein splitting is performed using quadtree disparity estimation.

41.   (Original)   The apparatus of claim 29, wherein splitting is performed using quadtree disparity estimation.

42.   (Currently Amended)   An apparatus to split an image block, which comprises:

a macro block splitting determining unit that sets a plurality of macro block splitting threshold values for splitting a macro block in an image frame into sub blocks and determines whether to split the macro block according to by determining whether a the macro block has been split at the same location in a preceding image frame at the same location as the current macro block has been split; and

a sub block splitting determining unit that sets a plurality of sub block splitting threshold values for splitting each sub block into smaller sub blocks and determines whether to split each sub block according to by determining whether a preceding the sub block at the same location has been split in the preceding macro block image frame at the same location as the current sub block has been split.

43. (Original)   The apparatus of claim 42, wherein the macro block splitting determining unit comprises:

a macro block splitting possibility determiner that determines the possibility of splitting the macro block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of the sub block in the macro block is greater than a threshold value for determining the possibility of splitting the macro block;

a preceding macro block splitting determiner that determines whether the preceding macro block has been split after determining that the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and a threshold value for determining whether to split the macro block; and

a macro block splitting final determiner that finally determines not to split the macro block if the preceding macro block has not been split, and determines to split the macro block if the preceding macro block has been split.

44. (Original)   The apparatus of claim 42, wherein the sub block splitting determining unit comprises:

a sub block splitting possibility determiner that determines the possibility of splitting the sub block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of the smaller sub block in the macro block is greater than a threshold value for determining the possibility of splitting the sub block;

a preceding sub block splitting determiner that determines whether the preceding sub block has been split after determining that the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and a threshold value for determining whether to split the sub block; and

a sub block splitting final determiner that finally determines not to split the sub block if the preceding sub block has not been split, and determines to split the sub block if the preceding sub block has been split.

45. (Original)   The apparatus of claim 42, wherein the image frame is a binocular image frame representing a three dimensional image.

17

46.   (Original)   The apparatus of claim 43, wherein the image frame is a binocular image frame representing a three dimensional image.

47.   (Original)   The apparatus of claim 44, wherein the image frame is a binocular image frame representing a three dimensional image.

48.   (Original)   The apparatus of claim 42, wherein splitting is performed using quadtree disparity estimation.

49.   (Original)   The apparatus of claim 43, wherein splitting is performed using quadtree disparity estimation.

50.   (Original)   The apparatus of claim 44, wherein splitting is performed using quadtree disparity estimation.

51.   (Currently Amended)   A method of splitting an image block, comprising:
    splitting macro image blocks each of left-eye views and right eye views into sub image blocks according to quadtree disparity estimation; and
    splitting each sub block into smaller sub blocks;
    wherein an image block splitting determining unit determines whether to split the image block by determining whether the image block has been split in a preceding image frame at the same location.

52.   (New) The recording medium of claim 25, the program coded method further comprising:
    determining whether to split the sub block into smaller sub blocks is performed by determining whether the sub block has been split in a preceding image frame at the same location.

53.   (New)   The apparatus of claim 42, wherein the macro block splitting determining unit comprises:

a macro block splitting possibility determiner that determines the possibility of splitting the macro block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of the sub block in the macro block is greater than a threshold value for determining the possibility of splitting the macro block.

54.   (New)   The apparatus of claim 42, wherein the macro block splitting determining unit comprises:

a preceding macro block splitting determiner that determines whether the preceding macro block has been split after determining that the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and a threshold value for determining whether to split the macro block.

55.   (New)   The apparatus of claim 54, wherein the macro block splitting determining unit comprises:

a macro block splitting final determiner that finally determines not to split the macro block if the preceding macro block has not been split, and determines to split the macro block if the preceding macro block has been split.

56.   (New)   The method of splitting an image block of claim 51, wherein the image block splitting determining unit comprises:

a macro block splitting determining unit determines whether to split the macro block by determining whether the macro block has been split in a preceding image frame at the same location.

57.   (New)   The method of splitting an image block of claim 51, wherein the image block splitting determining unit comprises:

a sub block splitting determining unit determines whether to split the sub block by determining whether the sub block has been split in a preceding image frame at the same location.